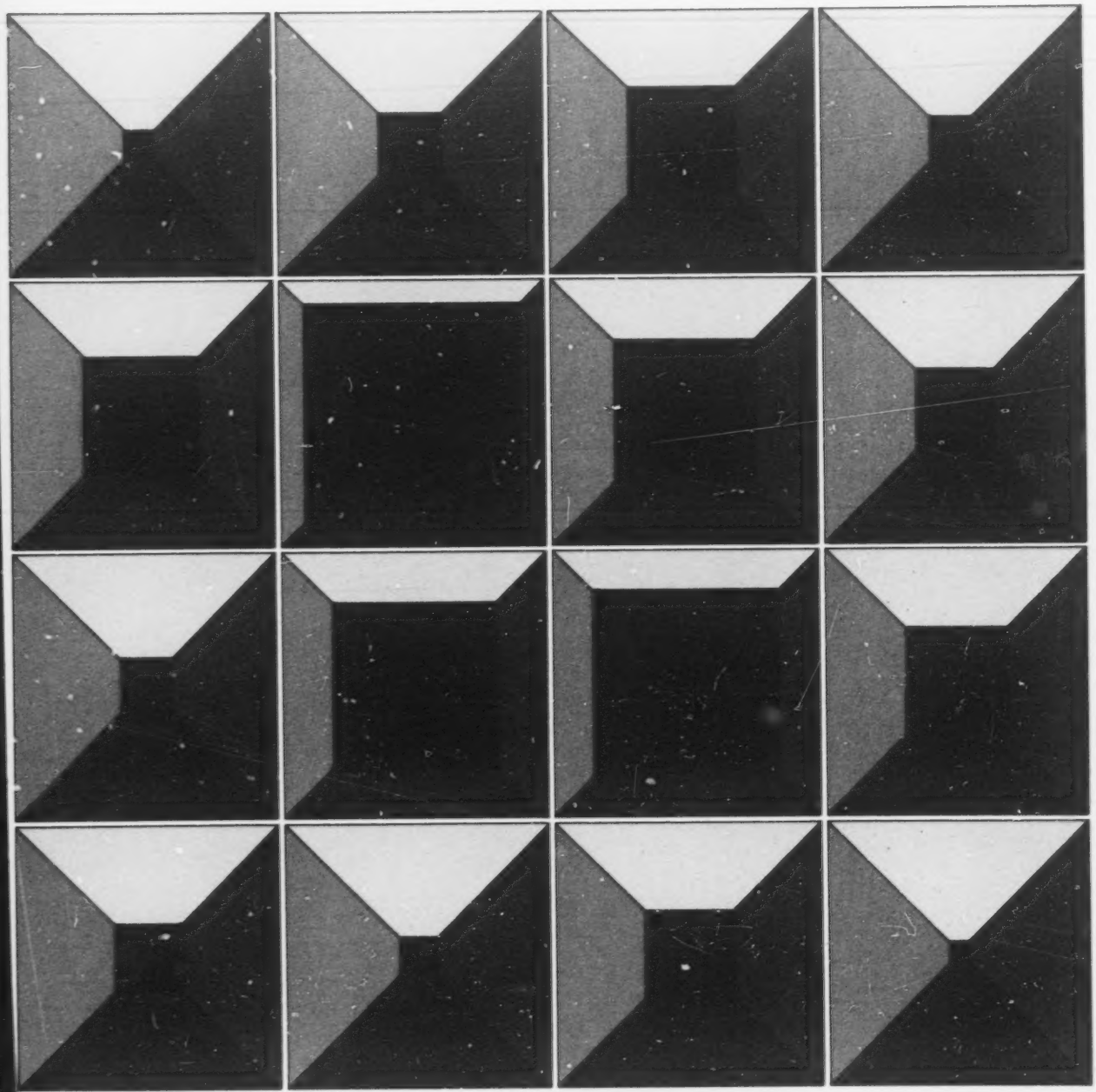
A CBO STUDY

Manpower for a 600-Ship Navy: Costs and Policy Alternatives

August 1983

Congress of the United States
Congressional Budget Office



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MANPOWER FOR A 600-SHIP NAVY:

COSTS AND POLICY ALTERNATIVES

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PREFACE

The Administration is planning to expand U.S. Navy battle forces from 509 ships in 1983 to over 600 ships by the end of this decade. To support this growth, the Navy is planning to add significant numbers of active, reserve, and civilian personnel. The planned expansion raises issues about the pay and recruiting policies necessary to support it. In addition, the manpower increases come at a time when the Congress is actively pursuing ways to limit growth in defense manpower costs. At the request of the House Committee on Armed Services, this study examines the key manpower issues surrounding the 600-ship Navy and presents options that would reduce costs. In accordance with the mandate of the Congressional Budget Office (CBO) to provide objective and impartial analysis, the study offers no recommendations.

The study was written by John Enns of CBO's National Security and International Affairs Division, under the general supervision of Robert F. Hale. Several CBO staff members assisted in preparing the report. Joel Slackman produced the estimates of Navy recruiting and retention results. Patrick Haar of the Budget Analysis Division prepared many of the cost estimates. Marvin Smith reviewed the paper and provided helpful criticism as did Bruce Vavrichek. John Warner, of Clemson University, also provided useful comments on earlier drafts of the paper. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.) Francis Pierce edited the manuscript, with the assistance of Nancy H. Brooks.

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SUMMARY

The Administration has proposed a rapid expansion of U.S. naval forces as part of its plan to revitalize U.S. defense capacity. The Navy believes that this higher force level--often referred to as a 600-ship Navy--is necessary to meet the growing threat posed by the Soviet navy and to respond to potential crises in areas such as the Middle East.

This report focuses on the key manpower issues surrounding the buildup:

- How many military and civilian personnel will be required during peacetime to support a 600-ship Navy?
- What are the key factors affecting the recruitment and retention of personnel? What effect does the level of civilian unemployment have on the supply of enlisted personnel? What will be the pay and retirement costs of the expanded Navy?
- If the pressure to hold down defense spending leads to a ceiling on manpower costs, what alternative strategies can the Navy pursue to reach its long-run objectives?

FORCE OBJECTIVES AND MANPOWER REQUIREMENTS

Today's Navy is manned by 560,000 active-duty personnel supported by 109,000 reservists and 309,000 civilians. (Civilians include direct and indirect hire government employees but not contract personnel.) By 1990 the Navy aims to have over 600 deployable ships--that is, ships capable of extended overseas service. That force will require an increase in active-duty personnel of about 66,000 (see Summary Table 1).

This report focuses on requirements--measured as authorized billets--for the years 1984-1988, which can be accurately projected on the basis of the current five-year fleet plans provided by the Navy. By the end of 1988 the Navy estimates that 47,000 more active-duty personnel will be needed to accomplish the planned expansion. Some increases in reserves and civilian personnel will also be necessary, as shown in Summary Table 1.

SUMMARY TABLE 1. NAVY FLEET OBJECTIVES AND MANPOWER REQUIREMENTS, FISCAL YEARS 1983-1990 (In numbers of ships and thousands of personnel)

	Budget 1983	1984	1985	1986	1987	1988	1989	1990
Number of Ships								
Deployable forces	509	527	546	556	569	582	600	608
Other	50	50	50	50	50	47	47	33
Total Ships	559	577	596	606	619	629	647	641
Personnel (in thousands)								
Active duty	560	572 a/	585	597	602	607	617	626
Selected Reserve	109	119 a/	126	133	141	143	143	143
Civilians	309	313	317	319	319	319	321	321
Total Personnel	978	1,004	1,028	1,049	1,062	1,069	1,081	1,090

NOTE: Figures for 1984 through 1988 are based on the current Navy plans for active and reserve force operations. The projections for 1989 and 1990 are CBO's estimates based upon the fiscal year 1984-1988 shipbuilding plans announced by the Administration. Selected Reserve numbers include Inactive Drilling Reservists, trainees, and full-time support personnel (TARS).

a. These figures represent the Navy's estimated requirements--measured as authorized billets--as of January 1983. However, it appears that the 1984 DoD authorization conference report will allow fewer active and reserve personnel. Chapter IV of this report suggests ways to achieve such reductions.

For the seagoing forces, CBO verified these projections and made estimates for 1989 and 1990 assuming that the Navy will use the same size ship and air squadron crews, or billet authorizations, for its operations in the future as it does today. For shore-based jobs--which are filled by military, civilian, and reserve personnel--the projections assume that the Navy holds

constant its "sea/shore" rotation, or the relative amounts of time enlisted personnel spend at sea and ashore. At present, the ratio averages about 3:2--that is, three years of sea duty followed by two years of shore duty. CBO's estimates show that beyond 1988, an additional 19,000 active-duty personnel will be required to support the Navy's buildup through 1990.

SUPPLY OF CAREER PERSONNEL AND RECRUITS

In providing manpower for a larger fleet, the Navy's recruiting efforts will be primarily concerned with the supply of enlisted personnel. Increasing the number of officers, reserve personnel, or civilians does not appear to present a major problem at this time, although selected groups--such as engineers and aviators--may require higher compensation over a full career to provide them with incentives to remain in the Navy. This report deals with the supply of enlisted personnel, including both career personnel (those with over four years of service) and recruits. Its projections assume that military personnel receive a 4 percent pay raise in January 1984 and "comparability raises"--that is, raises that keep pace with those in the private sector--in the years 1985 and beyond.

Under these assumptions, the Navy should be able to obtain adequate numbers of career personnel. Although the upswing in the economy will reduce civilian unemployment and so make retention of military personnel more difficult, CBO estimates that the number of Navy career enlisted personnel will grow from 219,000 by the end of 1983 to 259,000 by the end of 1988, meeting the Navy's objective for that year (see Summary Table 2).

The near-term outlook for recruiting is also favorable, despite a forecasted decline in the youth population through the mid-1990s. Recruiting success is often measured by the percentage of male recruits without previous military service who hold high school diplomas. Assuming that enough total numbers are recruited, this percentage is expected to exceed 80 percent in each year through 1987, falling to 79 percent in 1988 (see Summary Table 2). For comparison, the percentages in the last three years ranged from 73 to 77 percent. These recruiting projections are in part a reflection of the favorable outlook for career personnel discussed above, since higher career retention means that fewer recruits are needed.

Even if recruiting high-quality manpower should prove more difficult than these projections indicate, the Navy could increase the number of female recruits or recruits with previous military service--neither of whom is now in short supply. There are disadvantages to these policies: the number of female recruits might exceed the present limits on the number of

women who serve in nontraditional skills; and accepting higher numbers of previous service members would make promotion of today's enlisted members more difficult. Nevertheless, these changes in personnel policy would enable the Navy to keep the quality levels of its male recruits equal to those achieved in recent years even if recruiting conditions prove worse than CBO estimates.

SUMMARY TABLE 2. ESTIMATED SUPPLY OF NAVY CAREER PERSONNEL AND THE PERCENTAGE OF MALE RECRUITS WITH HIGH SCHOOL DIPLOMAS, FISCAL YEARS 1983-1988

	1983	1984	1985	1986	1987	1988
	Number of Personnel (in thousands)					
Career Enlisted Personnel with Over Four Years of Service						
Estimated number a/	219	233	244	247	255	259
Navy objective	239	244	249	254	257	259
	Percentages					
Estimated Percent of Male Recruits without Prior Military Service Who Hold High School Diplomas a/	82	87	82	81	81	79

a. Assumes that the civilian unemployment rate falls from 8.6 percent in 1984 to 6.9 percent in 1988 and military pay raises equal 4 percent in January 1984, 5.4 percent in 1985, 5.3 percent in 1986 and 5.2 percent in 1987 and 1988.

Added Costs

Meeting increased Navy manpower needs will, of course, add to costs. Under the Administration's plan, Navy military personnel costs (excluding retirement payments) would rise from $12.5 billion 1984 to $16.7 billion in 1988 and would total $73 billion over the five-year period 1984 to 1988 (see Summary Table 3). These estimates are in current fiscal year dollars. Retirement costs would also increase. Under an accrual accounting system--which records retirement obligations as they are incurred--the costs of future Navy retirees would rise from $3.9 billion to $5.3 billion during the 1984 to 1988 period, and total $23.1 billion for the five years.

Navy civilian personnel costs would increase from $7.9 billion in 1984 to $10.0 billion in 1988 and total $45.0 billion over the five years, under the same pay raise assumptions as for military personnel.

Recruiting and Retention Problems by Skill

During the buildup, recruiting and retention problems may be encountered for some of the roughly 100 occupational groups required to man the Navy. The Navy currently uses selective enlistment and reenlistment bonuses to help alleviate such manpower shortages. These payments may rise as the buildup proceeds, but the costs are likely to be modest relative to the total increase in Navy personnel costs.

WAYS OF REDUCING NAVY MANPOWER COSTS

While the Congress seems committed to a Navy buildup to over 600 ships, it is also seeking ways to hold down defense spending by limiting the growth in active-duty manpower costs. These competing goals might be reconciled in several ways. One way would be to limit pay raises in future years while increasing bonuses paid to those skills that experience shortages. Another would be to restrict the number of authorized personnel on active duty below that requested by the Administration. This latter approach could be implemented by transferring more missions to the Naval Reserve Force or by increasing the level of sea pay to encourage longer sea tours, thus reducing the need for enlisted shore rotation jobs.

Substituting Bonuses for Pay Raises

The Congress might choose to limit the size of the annual pay raise for military personnel below that projected for private-sector workers. This

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policy was adopted last year and continued in the First Concurrent Resolution on the Budget for Fiscal Year 1984 covering 1984 through 1986. If the pay raise limits are extended to future years, the Navy would suffer a decline in reenlistments and in accessions of "high-quality" recruits. Such manpower shortfalls could be partially offset by giving larger cash bonuses for enlistment and reenlistment which target the increases toward occupations where shortages exist. The Navy has used these incentives successfully in the past to alleviate selected manpower shortages.

This approach would eventually save substantial sums. If annual pay raises were limited to 4 percent in 1985 through 1988 (and Navy bonuses increased to offset the negative enlistment and reenlistment effect in occupations that have received bonuses in the past) the savings in 1985 would be $125 million, and over the period 1985 to 1988 would total $1.4 billion (see Summary Table 3). Savings would be substantially larger if these pay limits were applied to military personnel in the other services, and to civilians, as would likely be the case.

Substituting bonuses for part of a pay raise would have certain disadvantages, however. Not all Navy occupations are eligible for bonuses. Those that do not receive bonuses--because they are adequately manned--would not grow as quickly. CBO estimates that the size of the Navy's career force would total 255,000 in 1988 under this option, compared to 259,000 assuming full pay raises. Most of the decline, however, would be in skills that are not short of trained manpower, even at the lower numbers.

This policy would also substantially increase the average reenlistment bonus, which some believe would be inappropriate. By 1988, the average Navy bonus in today's dollars would be about $15,000. Today the average is $11,100. (The present ceiling of $16,000 for most Navy bonuses would also need to be raised so as to maintain the same incentive in constant dollars.) Critics point out that for the roughly 50 percent of all Navy personnel who receive them, bonuses mean substantially higher pay, and that such a differential is inconsistent with the common hazards faced by all personnel in wartime. It is worth noting, however, that even under this option bonuses would make up less than 4 percent of total Navy military personnel costs by 1988.

Increasing Sea Pay to Reduce Enlisted Shore Requirements

Another way to hold down costs without cutting manpower requirements would be to reduce the need for enlisted shore jobs. These provide a rotation base for personnel completing sea tours. At present, there are about three sea billets for every two shore billets in the Navy's enlisted

SUMMARY TABLE 3. NAVY MANPOWER COSTS AND POTENTIAL SAVINGS, FISCAL YEARS 1984-1988
(In millions of current dollars)

Personnel Category	1984	1985	1986	1987	1988	Total 1984-1988
Costs for Navy Manpower under the Administration Plan						
Military	12,460	13,650	14,700	15,720	16,710	73,230
Civilian	7,900	8,500	9,000	9,500	10,000	45,000
Total	20,400	22,150	23,700	25,200	26,700	118,250
Savings from:						
4 percent pay raise, 1984-1988, and increased bonuses a/	0	125	185	455	640	1,405
Increases in the Naval Reserve Force b/	20	50	75	100	145	390
Longer enlisted sea tours with additional sea pay c/	30	110	210	275	295	920

NOTE: All costs represent budget authority.

a. Assumes that military pay raises are limited to 4 percent in 1984-1988 and enlistment and reenlistment bonuses are increased.

b. Assumes that the reserve force is increased from 43 ships in 1988 (the Administration's plan) to 63 ships.

c. Assumes that enlisted sea duty tours are increased (with higher sea pay) and shore billets are eliminated from the active force.

manpower plans. If this ratio was increased from 3:2 to 3.5:2, so that on average each sailor spent about three months more of a tour assigned to a ship or carrier air squadron, by 1988 14,500 fewer active-duty personnel would need to be assigned to shore duty. This estimate assumes that those already serving more than 70 percent of their tours at sea would be exempt from increases.

Simply increasing sea-duty time would increase the time Navy personnel spent on arduous duty and reduce the time spent with families ashore. This could worsen morale and cause an exodus of career personnel. Offering higher sea pay, however, could offset the negative effect on retention. (Sea pay is special compensation paid monthly to career personnel for extended time served at sea.) Indeed, studies suggest that an average 18 percent increase in sea pay (which now accounts for only 1.1 percent of the Navy's personnel budget) would fully offset the adverse effects on retention of a shift to sea/shore rotation of 3.5:2.

The savings from reducing shore personnel by 14,500--even when offset by the added costs of more sea pay--would still amount to about $30 million in 1984 and $295 million in 1988. Savings would total $920 million over the five-year period (see Summary Table 3). Nor should these reductions prevent the Navy from accomplishing its tasks at shore facilities. Over 500,000 active-duty and civilian personnel now work ashore. This reduction would be less than 3 percent of the total Navy manpower ashore. Although some additional civilian or contractor support might be required, this decrease should not cause a backlog in maintenance or any other shore-based activity, especially since some shore jobs are maintained solely as rotation billets.

Increasing the Size of the Naval Reserve Force

To provide additional ships and air squadrons for wartime mobilization, the Navy maintains a reserve force. Increasing the number of ships in the reserve force would cut the numbers of active-duty personnel and their costs, though at the expense of peacetime operating capability. The Navy currently plans to build the reserve force up from 33 to 43 ships between 1984 and 1988. Most of the additions will be escort ships of the small frigate-class size. If the Navy transferred 20 additional ships to the reserves (and manned these ships with 50 percent active-duty and 50 percent reserve crews, as the Congress has directed for frigates), additional manpower reductions ranging from 2,325 in 1984 to 9,500 in 1988 would be possible. Requirements for reserve personnel would grow by similar amounts. But it seems likely that the Naval Selected Reserve (Inactive Drilling)--which will increase in size from 92,000 in 1983 to 124,000 in 1988--could accommodate some of the increases.

An increase in the size of the reserve force would reduce the ships available to deploy in peacetime, since reserve ships deploy only for the few weeks a year when their reserve crews are all aboard. (At other times, reserve ships remain in port or participate in short training exercises.) A transfer of 20 more ships would mean about 4 percent fewer active-duty ships available for deployment. Such a reduction could be accommodated by deploying fewer ships to overseas operating areas in peacetime, rather than by reducing overseas commitments, and might be acceptable in light of the need to hold down costs.

The reduction might be more acceptable if accomplished by transferring older ships that are numerous, so that adequate numbers would still be available in peacetime, or that have missions primarily needed only in wartime. For example, one way to transfer 20 additional ships to the reserves would be to transfer ten of the older DDG-2 class of destroyer (15 percent of all destroyers now in the active fleet) and six older amphibious ships of the LST and LSD classes (20 percent of all such active ships), together with all four of the battleships that are now in service or scheduled to be reactivated.

If the Navy increased the size of the reserve force by 20 ships by 1988 (beyond the currently planned number of 43 ships), manpower savings would range from $20 million in 1984 to $145 million in 1988 and total $390 million over the five-year period (see Summary Table 3). These estimates include the costs of additional reserve personnel above the number planned by the Administration. However, it may be possible to meet some of the increase in reserve requirements with the increases already planned by the Administration. If this were done, the savings would be greater than those calculated above.

Savings would also be larger if they included reductions in costs of operating the ships at the reduced tempo characteristic of the reserves. Additional savings in the operation and maintenance appropriation could amount to $72 million in 1984, increasing to $350 million in 1988 and totaling over $1 billion over the five-year period.

CHAPTER I. INTRODUCTION

The Administration has initiated a major expansion of U.S. naval forces over the next ten years as part of its defense buildup. For fiscal year 1983, the Congress appropriated $16.1 billion to buy 14 new ships and convert 3 others. The Navy's five-year shipbuilding plan for 1984-1988 includes 124 new ships with a projected cost of $93 billion (in current dollars). The majority of these ships would be "deployable" combatants--that is, capable of wartime service at overseas locations--built to support or add to the Navy's carrier battle groups, the predominant naval force structure used today. 1/ By 1988 the Navy would have 14 deployable carrier battle groups--one less than the long-run goal of 15--and a total of 582 deployable ships. If additional ships were authorized for 1989-1990, the Navy could reach its long-term objective of 610 deployable ships in the early 1990s.

A larger fleet will require more manpower. For the active-duty force, the Navy estimates that an additional 40,000 enlisted personnel and 6,500 officers will be required by the end of fiscal year 1988. For the career enlisted force--those with over four years of service--the Navy projects a total requirement that year of 259,000 personnel as compared to an estimated 219,000 at the end of fiscal year 1983. Thus, most of the growth in enlisted personnel will consist of career service members. In addition to these active force increases, the Navy also plans to add 27,000 Inactive Drilling Reserve personnel, 5,000 full-time Reservists, and 10,000 civilians by 1988. 2/

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1. The Navy divides its ships into "deployable" versus "nondeployable" categories. Deployable ships are those that would be used in wartime at overseas locations. Carrier battle groups are the primary wartime forces. Each carrier battle group is comprised of one aircraft carrier, attack submarines, surface combatants, and support ships. During peacetime, the Navy normally deploys two carrier battle groups to both the Mediterranean Sea and the Western Pacific. The recent turbulent conditions in the Middle East have now given rise to a requirement for naval forces in the Indian Ocean as well. Thus, there are currently five deployed carrier groups sustained by a force of 13 deployable carriers.

2. In this report, the term "civilians" refers to federal direct and indirect hire personnel. It does not include contract personnel.

This study first presents estimates of increased manpower requirements under current manning policies and the cost increases involved. Since these added manpower requirements come at a time when the Congress is attempting to place limits on the growth in numbers of military personnel in order to hold down costs, the study then considers alternative manpower policies the Navy might employ to reduce those costs. The study focuses on active-duty manpower, and particularly on enlisted manpower, but also considers the costs of reserve and civilian manpower.

Background

Today's Navy is manned by 560,000 active-duty personnel, with support from 309,000 civilians and 109,000 Selected Reserve personnel. Altogether, outlays for Navy manpower in 1983 is estimated to total $18.3 billion, excluding payments to retirees.

Because the active force is managed as a closed personnel system--that is most enter the Navy as new recruits and gain experience while on active duty--the Navy must plan well ahead to ensure that it will have enough experienced manpower to support the buildup. The current size and distribution of active-duty manpower is the result of many decisions made over the last two decades. For example, during the Vietnam war the number of personnel choosing to reenlist at the end of their initial enlistment dropped to low levels, with the result that a series of relatively small groups entered the career force--the senior enlisted petty officers of today. The problem of retaining skilled personnel was further aggravated by limits set on military pay raises between 1976 and 1979, which further reduced the supply of experienced sailors choosing to remain in the Navy. Although offsetting measures were introduced--for example, the number of cash bonuses paid to personnel reenlisting was more than doubled--by the end of 1979 the number of petty officers in pay grades E-5 to E-9 had declined by over 20,000, or 10 percent, since the end of the Vietnam war. 3/

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3. The majority of Navy enlisted personnel have an initial obligation to serve four years. Petty officers serve in grades E-4 to E-9 after completing recruit training and achieving job proficiency in their designated skills. However, most E-4 grade petty officers have fewer than four years of active service and thus are not necessarily committed to a Navy career. In this report, the enlisted career force is defined to include personnel with five or more years of service. Except for nuclear trained personnel who usually enlist for six years and are promoted at a faster pace, this group will normally include the majority of E-5 to E-9 grade personnel.

Thus the Navy began the 1980s with shortages in many skills and a much less experienced enlisted force than a decade earlier. The supply of officers was generally adequate, although some shortages existed in fields with attractive civilian alternatives--for example, aviation and engineering. In 1981 and 1982, the Congress increased military pay, relative to pay in the private sector, by about 10 percent and also increased reenlistment bonuses. This, together with increasing unemployment in civilian life, helped the Navy retain more career personnel and supported its recent expansion in operations. Nevertheless, between two and three years of training and on-the-job experience are needed to make a new recruit fully productive. Thus, the new naval forces planned for the second half of this decade will require several years of manpower buildup.

Plan of the Study

This report discusses the Navy's long-run manpower requirements (Chapter II) and the prospects and costs of meeting those requirements (Chapter III). In both chapters it is assumed that the Administration's plan to expand the Navy to 610 ships is achieved using current personnel and pay policies. Chapter IV examines alternative policies that could hold down costs while meeting most of the Navy's manpower objectives.

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CHAPTER II. MANPOWER REQUIREMENTS FOR THE 600-SHIP NAVY

This chapter presents the Navy's projections of its requirements for manpower under current five-year plans for fleet expansion. The projections for active-duty personnel are based on peacetime, rather than wartime, requirements. For ship- and sea-based air squadrons, the Navy has developed detailed manpower requirements for wartime conditions. 1/ Since these requirements are rarely met during peacetime, this study uses the lower active-duty manpower levels defined in the billet allowance system--the Navy allocation plan that is consistent with the personnel levels included in the five-year defense plan for 1984-1988 and authorized each year by the Congress.

This chapter also presents the Navy's estimates of requirements for reserve and civilian personnel. Reserve personnel would be used in the event of a mobilization to fill out active ship and squadron crews. Thus, reserve requirements in this study are based on wartime plans. Civilian personnel requirements, on the other hand, are determined primarily by shore support workloads--such as ship overhauls--which, in this report, are related to peacetime operations only.

BACKGROUND ON NAVY MANPOWER REQUIREMENTS

The Navy requirements for military manpower are determined both by the size of the operating fleets and by the missions to which the various

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1. The Navy maintains detailed manning requirements for each ship and air squadron in the active fleet. The ship requirements are listed in Ship Manning Documents (SMDs) and the air crew requirements in Squadron Manning Documents (SQMDs). Both types of requirements are developed for a wartime scenario under assumptions of full mission capability and high operating tempo. To support these plans, selected reserve billets are also included where necessary. During peacetime, however, the fleet manning objectives are defined by the billet allowance system. This system allocates all of the authorized Navy manpower among ships and squadrons as well as the shore support and training establishment. Thus, it is a more complete statement of the manpower needs and reflects budget constraints faced by the Navy during peacetime.

ships, squadrons, and support groups are assigned. Ships are organized in three groups: active and reserve forces and the Military Sealift Command. Those in the active fleet--which deploy regularly overseas--are manned and maintained by active-duty personnel. In the event of a wartime mobilization, their crews would be augmented by reserve personnel. During peacetime, the Naval Reserve Force provides training for reserve personnel as well as performing a wide range of support missions that do not require overseas deployment. At present, the crews of most reserve ships are about 65 percent active and 35 percent reserve personnel, although the Congress has directed a 50/50 mix for the frigate-class ships assigned to the Reserves. A third class of ships, grouped under the Military Sealift Command, includes vessels--such as oil tankers--that provide direct support to the active and reserve forces. These are normally manned by civilians during peacetime, but would be converted to military status in the event of a mobilization.

In addition to its seagoing forces, the Navy maintains a large number of shore facilities where personnel perform ship and aircraft maintenance, training, medical, engineering, and research functions. Shore jobs that can provide additional combat capability during wartime are normally filled with military personnel, while civilians are used for noncombat-related positions. For example, minor repair and maintenance of ships is usually done by military personnel since this work would probably be performed overseas during a conflict, whereas major ship overhauls are conducted in U.S. shipyards with civilian personnel.

Civilian and reserve personnel generally work in one location, while active-duty military personnel rotate between sea and shore duty assignments. The latter do not always perform the same jobs on shore and at sea. For example, ship boiler technicians have no directly comparable job at shore facilities and so are generally assigned other duties. By contrast, aviation repair and maintenance personnel are required at naval air stations as well as aboard aircraft carriers; thus their skills are directly transferable.

Navy Fleet Plan

The growth in Navy manpower requirements will follow closely the path of fleet expansion. Navy planning focuses on the "deployable forces"--those ships that would be used in combat situations overseas. Its long-run objective is to build and sustain a deployable 610-ship fleet--including 15

carrier battle groups. 2/ The Administration claims to be well along toward accomplishment of these goals. The deployable forces will number 509 ships at the end of fiscal year 1983 (see Table 1), of which 35 ships will be

TABLE 1. PROJECTED TOTAL DEPLOYABLE SHIPS UNDER THE NAVY'S PLANNED BUILDUP, 1983-1990
(End of fiscal year)

Ship Class	1983	1984	1985	1986	1987	1988	1989	1990
Deployable Forces								
Strategic forces								
Submarines (SSBN)	34	35	37	39	39	39	41	42
Support	7	7	7	7	7	7	7	7
Battle forces								
Carriers	13	13	13	13	14	14	14	15
Submarines (SSN)	91	93	96	97	99	98	96	97
Cruisers	28	29	30	32	35	38	42	46
Destroyers	69	69	69	69	69	69	70	65
Frigates	93	102	107	111	113	113	113	113
Battleships	1	1	2	2	2	3	4	4
Amphibious	63	61	61	62	62	64	67	67
Mobile logistics	52	53	53	53	53	55	58	60
Mine warfare	3	3	4	5	10	14	22	25
Other	12	12	12	12	12	12	8	7
Support forces	43	49	55	55	54	56	58	60
Total Deployable Forces	509	527	546	556	569	582	600	608

SOURCE: U.S. Navy.

2. For a complete discussion of the Navy's long-run fleet objectives, see Congressional Budget Office, Building a 600-Ship Navy: Costs, Timing, and Alternative Approaches (March 1982), Chapter III.

assigned to the Naval Reserve Force or the Military Sealift Command (see Table 2). By 1990, the force is projected to reach 608 ships--of which all but 81 are planned for the active fleet. At that time the fleet will have 15 carrier battle groups available for deployment.

In addition to the deployable forces, the Navy currently operates 50 ships not intended for wartime deployment, to perform training and routine port operations (see Table 2). These are manned by active-duty, reserve, and civilian personnel. Under current plans, the number of ships in this category will decline from 50 to 33 by 1990.

TABLE 2. PROJECTED SHIPS ASSIGNED TO NAVAL RESERVE FORCE AND SEALIFT COMMAND, 1983-1990 (End of fiscal year)

Ship Class	1983	1984	1985	1986	1987	1988	1989	1990
Deployable Forces								
Battle forces								
Destroyers	1	1	1	1	1	1	1	1
Frigates	6	9	11	15	19	24	24	24
Mobile logistics	16	17	17	17	20	22	25	26
Amphibious	2	2	2	2	2	2	2	2
Support forces	10	13	21	22	22	24	26	28
Total Deployable Forces	35	42	52	57	64	73	78	81
Other Sealift, Auxiliary, and Reserve Ships	50	50	50	50	50	47	47	33
Total, All Reserve and Sealift Command Ships	85	92	102	107	114	120	125	114

SOURCE: U.S. Navy.

This study assumes that the buildup will be carried out. Even if shipbuilding budgets in the next several years were to be curtailed, the Navy could still reach its goal by retaining older ships in active service longer than previously planned.

REQUIREMENT PROJECTIONS

Active-Duty

If the fleet expands as planned, the Navy projects a requirement for over 600,000 active-duty personnel by 1988 (see Table 3). Although Navy estimates are not available beyond 1988, CBO estimates that an additional 19,000 active-duty personnel would be required by the end of 1990. (CBO verified Navy estimates for 1984-1988, and made estimates beyond 1988, assuming the same crew sizes for ships and squadrons as in prior years and the Navy's fleet plan through 1990.) At that level--626,000--the Navy would have 66,000 more persons on active duty than today. This would be slightly below the level of the early 1960s--a period when the active fleet included over 900 ships, but when average ship and crew sizes were well below those of today.

More than half of the growth in active-duty personnel is in sea-going billets required to man the larger numbers of ships and squadrons. The fastest growth would occur in 1984-1986, and again in 1988-1990, the periods preceding the introduction of new aircraft carriers.

The requirements for active-duty shore-billets--the military jobs located at land-based facilities--are not as easy to project as the sea billet requirements, since either military or civilians can perform many of these jobs. Moreover, shore billet requirements for active-duty enlisted personnel are influenced by the sea/shore rotation policies followed by the Navy. Since long, uninterrupted periods on sea duty can have a negative influence on retention, the Navy tries to maintain a balance between time at sea and ashore; this is accomplished in part by reserving jobs at shore facilities for sailors finishing their sea tours. For the last several years, the average sea/shore rotation ratio for all Navy enlisted personnel has been three years of sea duty and two years of shore duty. The Navy's manpower estimates for 1984 through 1988 imply that this ratio will be maintained and, thus, this study assumes the same policy will be followed for years beyond 1988.

The final category of active-duty requirements include overhead billets or "individuals," used primarily for recruit training. As Table 3 indicates, this requirement is projected to remain fairly constant over the 1984 to 1986 period and then rise slightly. In order for this pattern to be

TABLE 3. ACTIVE-DUTY PERSONNEL REQUIREMENTS BY TYPE OF BILLET UNDER THE NAVY PLAN, FISCAL YEARS 1983-1990 (In thousands)

Type	1983	1984	1985	1986	1987	1988	1989	1990
Ship/Squadron a/								
Enlisted	241	247	256	263	264	267	270	274
Officer	19	19	20	21	21	21	22	23
Total Sea	260	266	276	284	285	288	292	297
Shore b/								
Enlisted	164	167	171	173	174	174	180	183
Officer	38	39	39	40	40	40	40	41
Total Shore	202	206	210	213	214	214	220	224
Overhead c/								
Enlisted	83	84	82	83	85	88	88	88
Officer	15	16	17	17	17	17	17	17
Total Overhead	98	100	99	100	102	105	105	105
Total Enlisted	488	498	509	518	523	529	538	545
Total Officer	72	74	76	79	79	78	79	81
Total Active Navy	560	572	585	597	602	607	617	626

SOURCE: Department of Defense and CBO estimates.

NOTE: Fiscal year 1984 requirement represents the Navy's request of January 1983. At the time of publication it appears that fewer personnel will be authorized in the 1984 DoD Authorization approved by the Congress.

a. Includes billets for carrier-based air squadrons only. Estimates for 1989-1990 are based on continuation of current ship/squadron sizes and projected fleet size.

b. Includes 25,000 personnel assigned to shore-based air squadrons. The estimates for 1989-1990 are based on a ratio of sea to shore billets of 3:2 for enlisted and 1:1.8 for officers.

c. Includes cadets, students, trainees, patients, prisoners, and personnel in transit (permanent change of station).

consistent with the overall growth planned for this decade, the Navy must reenlist larger numbers of sailors than in the past, so that the size of the career force will grow and the demand for new recruits--who require six to twelve months of training--will not need to rise as rapidly.

Reserve and Civilian Personnel

Although ships assigned to the Naval Reserve Force do not deploy at sea for long periods, they steam regularly for training exercises and would be deployed during a mobilization. Most have active-duty crews equal to at least 65 percent of the full crew requirement. The remaining billets are filled with Selected Reservists who spend one weekend a month, plus a two-week summer period, training with the active crew. In addition, approximately 12,000 reserve personnel work full-time providing support to the active forces.

The planned increase in Selected Reserve billets shown in Table 4 will support a growth in reserve fleet ships from 33 at present to 43 in 1988. The largest portion of this growth is scheduled for ship maintenance, an area where current reserve manpower is felt to be inadequate.

Requirements for Navy civilian personnel are concentrated in depot-level maintenance activities for the repair of ships, aircraft, and associated equipment. A relatively small number of civilians work as crew members on board ships assigned to the Military Sealift Command. Direct- and indirect-hire civilians--the latter employed primarily overseas--will increase from 309,000 in 1983 to 319,000 in 1988 (see Table 5).

TABLE 4. NAVY SELECTED RESERVE REQUIREMENTS, 1983-1988 (In thousands)

Type of Billet	1983	1984	1985	1986	1987	1988	Total Increase Fiscal Years 1983-1988
Ship/ Squadron	70	72	74	76	79	80	+10
Shore	37	41	46	52	56	57	+20
Overhead	2	6	6	6	6	6	+4
Total	109	119 a/	126	134	141	143	+34

SOURCE: Office of the Secretary of Defense.

NOTE: Figures include Inactive Drilling personnel, trainees, and full-time reservists (TARS).

a. Consistent with Navy request of January 1983. At the time of publication, it appears that the 1984 DoD Authorization Bill will allow fewer reserve personnel.

TABLE 5. NAVY CIVILIAN MANPOWER REQUIREMENTS, FISCAL YEARS 1983-1988 (In thousands)

Type	1983	1984	1985	1986	1987	1988
Ship/Squadron	10	10	10	10	10	10
Support	299	303	307	309	309	309
Total	309	313	317	319	319	319

SOURCE: U.S. Navy.

CHAPTER III. MANPOWER SUPPLY AND COSTS

As Chapter II showed, the Navy will need to add about 45,000 enlisted personnel to its active-duty force by the end of 1988 in order to carry out its planned expansion. This chapter discusses the key assumptions regarding factors that will influence recruiting and retention, and presents estimates of the total supply of enlisted personnel. Officers, reserve, and civilian personnel are less likely to be in short supply. 1/ The chapter also estimates the pay and retirement costs of the expanded Navy.

KEY ASSUMPTIONS ABOUT ENLISTED SUPPLY

Several factors will affect the supply of enlisted personnel and, hence, the ability of the Navy to meet its requirements. This study's assumptions about each key factor are noted below. Appendix A discusses the assumptions in more detail and describes the methods used to project enlisted supply.

- Navy Demand for Enlisted Personnel. The study assumes that the Navy attempts to meet demands discussed in Chapter II by accepting all qualified recruits and reenlistees.

- Demand for Enlisted Personnel in Other Services. The numbers of recruits willing to enter the Navy will be influenced by the recruit demands of the other services, particularly by the Air Force, which offers valuable training for many jobs in the civilian sector. This study assumes that the other services carry out the five-year buildup in forces requested in the President's January 1983 budget. For the Air Force, this would mean growth in their enlisted force from 500,000 in 1984 to 526,000 by 1988.

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1. Although recruitment of naval officers does not appear to be a problem at this time, retention of middle-grade officers, O-4 to O-6, in selected occupations may become more difficult as requirements grow. For example, see an analysis of nuclear submarine officer manpower supply in Gordon R. Dickens, Manning the Nuclear Submarine Force of the 1980s and Beyond: An Officer Study, Master's Thesis (Naval Postgraduate School, June 1982).

- o Pay Raises. The size and distribution of pay raises influences recruiting and retention. This study assumes that military personnel receive a 4 percent pay raise in January 1984 and that raises beyond 1984 keep pace with those in the private sector. All raises are assumed to be provided "across the board"--that is, in equal percentages for all enlisted personnel. (The absence of a pay raise for junior personnel, which the Congress may mandate in the 1984 DoD Authorization Bill, would not significantly affect these results unless it was continued beyond 1984.)

- o Labor Market Conditions. Falling unemployment makes retention and recruiting more difficult because more persons leave the military to pursue civilian opportunities and fewer recruits are willing to join. This study assumes that unemployment follows CBO's August 1983 projection, which shows overall unemployment falling from 8.6 percent in 1984 to 7.6 percent by 1986. 2/

SUPPLY OF CAREER PERSONNEL

Based on these assumptions, over the five years between fiscal years 1983 and 1988, the Navy would add 40,000 personnel to its enlisted career force (see Table 6). The growth would be concentrated in the first three years, 1984-1986, when 30,000 people would be added. Table 6 also shows the Navy's current career force objectives--measured as 49 percent of total enlisted strength. Enlisted supply would fall short of this objective through 1987.

Reaching the 49 percent career force objective would allow the Navy to eliminate its past shortfall of experienced enlisted personnel--the oft-cited "petty officer shortage." (Petty officers are fully trained enlisted personnel in grades E4-E9. The Navy has maintained in past years that available petty officers were 20,000 below the required number.) The need for this higher career content is difficult to evaluate (during the last decade, the career force has averaged only 41 percent of the total enlisted force each year). Studies of the relative productivity of first-term as

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2. See Congressional Budget Office, The Economic and Budget Outlook: An Update (August 1983). CBO's latest published projections do not include years beyond 1986. To provide estimates through 1988, earlier CBO estimates from January 1983 (which included 1987 and 1988) were revised to reflect the latest forecasts. These revisions show unemployment falling to 6.9 percent in 1988.

against career personnel suggest that, in skills where high training costs prevail, it is often possible to achieve cost savings, with no loss of capability, by substituting more experienced for less experienced personnel. 3/ However, the need to plan for wartime mobilization--when the demand for low-skill jobs would increase rapidly--and the traditional emphasis on youth in the Navy imply that economic considerations alone may be too narrow a focus for determining the best mix of personnel.

Nevertheless, there is one important reason for pursuing a higher career content. Over the next twelve years, Navy recruiting will face a decline in the primary pool of recruits--male high school graduates who score in the top three categories on the entrance examination. One way to offset this decline and maintain high recruit quality is to increase the retention of career personnel, thus reducing the number of recruits needed. Projections of Navy recruiting results are presented in the following section assuming that the career retention results shown in Table 6 are achieved.

TABLE 6. ESTIMATED NUMBER OF NAVY ENLISTED CAREER PERSONNEL WITH MORE THAN FOUR YEARS OF SERVICE (By fiscal year, in thousands)

	1983	1984	1985	1986	1987	1988
Navy Objective a/	239	244	249	254	256	259
Estimated Number	219	233	244	249	255	259

a. Equal to 49 percent of enlisted personnel requirement shown in Table 3.

3. See, for example, studies by Donald B. Rice, Defense Resource Management Study: Final Report, prepared for the Secretary of Defense (February 1979), Chapter IV; Mark J. Albrecht, Labor Substitution in the Military Environment: Implications for Enlisted Force Management (The Rand Corporation, November 1979); and A.J. Marcus, Personnel Substitution and Navy Aviation Readiness (Center for Naval Analyses, October 1982).

SUPPLY OF RECRUITS

The Navy and the other military services can almost always meet their demands for numbers of recruits, but attracting high-quality recruits is frequently a challenge. Thus, a commonly used measure of recruiting success is the percentage of male recruits without previous service who hold high school diplomas. Educational attainment is an important indicator of recruit quality because high school graduates are more likely than nongraduates to succeed in the Navy. (Among graduates, the rate of attrition--or failure to complete the first term of enlistment--is roughly half that of nongraduates.)

If the Navy meets its total requirements for recruits, then under the assumptions discussed above, the proportion of "scarce" recruits--males with no previous service who hold high school diplomas--is projected to reach 82 percent in 1983 and 87 percent in 1984 (see Table 7). Beyond 1984, the projections show a steady decline reflecting a constant demand for new recruits--roughly 100,000 each year--and a declining supply of scarce recruits. Table 7 also compares the projected recruiting results to those achieved during 1980-1982, when the percentage ranged from 73 to 77. Although the Navy does not formally stipulate the percentage of male high school graduate recruits it wants, the results for the previous three years suggest a standard by which to evaluate the projections. Under these assumptions, the Navy would exceed its past recruiting results in 1984 through 1988.

TABLE 7. ESTIMATED PERCENTAGES OF MALE RECRUITS WITHOUT PREVIOUS SERVICE AND WITH HIGH SCHOOL DIPLOMAS (By fiscal year)

	Actual			Estimated					
	1980	1981	1982	1983	1984	1985	1986	1987	1988
Estimated Percentage	73	74	77	82	87	82	81	81	79

NOTE: To make these projections, the Navy's enlisted requirements were adjusted to account for recruiting of full-time reserve personnel (TARS).

If CBO estimates prove optimistic, the Navy could increase the number of female recruits or recruits with previous military service, since neither group is now in short supply. Such policies would reduce the demand for male recruits with no previous service, and so improve the percentages in Table 7. They might, however, produce unwanted consequences for Navy personnel management. For example, they could breach the present limits on the number of women serving in non-traditional jobs, or make promotion slower as larger numbers of recruits with prior service entered mid-career pay grades.

Recruiting and Retention Problems by Skill

As the buildup proceeds, recruiting and retention problems may be encountered for some skills although manpower goals overall are met. The Navy currently uses enlistment and reenlistment bonuses to increase compensation in occupations where problems arise. These payments may need to rise as the fleet expands, but the costs are likely to be modest relative to the total increase in Navy personnel costs.

COSTS UNDER THE NAVY'S PLAN

Meeting increased Navy manpower needs will, of course, raise costs in several budget accounts. Active-duty and reserve pay and allowances, subsistence-in-kind, permanent change-of-station costs, and government contributions to Social Security are funded in the military personnel (MPN, RPN) accounts. Payments to Navy retirees, both active and reserve, are funded separately in the military retired personnel account on a pay-as-you-go basis. This means that retirement outlays over the next five years will be virtually unaffected by the Navy's buildup since they are determined only by past manpower policies and do not reflect current manpower levels. However, the additional manpower will increase future retirement obligations and, under an accrual system that budgeted for future obligations, these increases would be reflected in the budget immediately as accrual costs.

Navy civilian costs are funded primarily in the industrial fund and operations and maintenance accounts, but are also included in the family housing, military construction, and research and development accounts. Included in these costs are salaries for both general-schedule and wage-board employees. Unless otherwise specified, all costs in this study reflect budget authority.

Military Personnel Costs

To accomplish the buildup, CBO estimates that the Navy's military manpower costs will rise from $12.5 billion in 1984 to $16.7 billion in 1988 (see Table 8). Costs would total $73.2 billion over the five-year period. These estimates are in current fiscal year dollars and assume that all personnel receive a 4 percent raise in January 1984 and comparability pay increases thereafter, adjusted for CBO's estimates of inflation over the five-year period. These estimates include active-duty and reserves and both enlisted and officer personnel.

TABLE 8. PROJECTED COSTS OF NAVY MILITARY PERSONNEL UNDER THE ADMINISTRATION PLAN, FISCAL YEARS 1984-1988
(In millions of current dollars)

Type of Personnel	1984	1985	1986	1987	1988	Total 1984-1988
Active Duty	11,700	12,760	13,710	14,620	15,510	68,300
Reserve	760	890	990	1,100	1,200	4,940
Total	12,460	13,650	14,700	15,720	16,710	73,240

NOTE: The projections assume the following annual pay raises: 1984, 4 percent; 1985, 5.4 percent; 1986, 5.3 percent; 1987 and 1988, 5.2 percent.

The costs of Navy military retired pay will also be affected by the buildup. Under an accrual accounting system--which budgeted today for future retirement obligations--the costs of retired pay would rise from $3.9 billion in 1984 to $5.3 billion in 1988 and total $23.2 billion over the five-year period (see Table 9). Although today's appropriations for retired pay are made on a pay-as-you-go basis--and thus would not be affected by the

buildup over the next five years--the 1984 DoD Authorization Bill may require accrual charges to be included in fiscal year 1985. 4/

Civilian Costs

CBO estimates that salaries for Navy civilians would rise from $7.9 billion in 1984 to $10.0 billion in 1988 (see Table 10). Retirement costs would also rise. The Office of Personnel Management estimates that the normal cost percentage of the total civilian payroll that would be required

TABLE 9. PROJECTED RETIREMENT ACCRUAL CHARGES FOR NAVY MILITARY PERSONNEL UNDER THE ADMINISTRATION PLAN, FISCAL YEARS 1984-1988 (In millions of current year dollars)

Type of Personnel	1984	1985	1986	1987	1988	Total 1984-1988
Active Duty	3,649	3,935	4,213	4,478	4,725	21,000
Reserve	292	325	361	403	427	1,808
Total	3,941	4,260	4,574	4,881	5,152	22,808

NOTE: Under accrual accounting rules (which may be required in the 1984 DoD Authorization Bill), the budget would show the amount that would have to be set aside to fund in full retirement liabilities that military personnel earn each year. The "normal cost" percentage--an actuarial measure used to compute accrual charges--is 50.7 percent of basic pay in the table above.

4. See Congressional Budget Office, Accrual Accounting For Military Retirement: Alternative Approaches, Staff Working Paper (July 1983) for a complete discussion of accrual budgeting.

to fully fund retirement benefits is 35.2 percent. 5/ Under accrual accounting, the retirement costs would increase from $2.5 billion in 1984 to $3.2 billion in 1988 and total $14.5 billion over the five-year period.

TABLE 10. PROJECTED PERSONNEL COSTS FOR NAVY CIVILIANS, FISCAL YEARS 1984-1988 (In millions of current year dollars)

Cost Category	1984	1985	1986	1987	1988	Total 1984-1988
Salaries a/	7,900	8,510	9,050	9,550	10,040	45,050
Retirement Costs Under Full Accrual Accounting b/	2,530	2,730	2,910	3,060	3,220	14,450

a. Pay raise assumptions for Navy civilians are the same as those for military personnel. See footnote to Table 8.

b. The "normal cost" percentage used to compute civilian retirement accrual charges is 35.2 percent. Since employees contribute 7 percent, the government's liability is 28.2 percent of total civilian salaries. The estimates cover U.S. direct-hire employees only--about 91 percent of all Navy civilian employees.

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5. Actuarial comparisons of retirement costs are based on the present value of projected benefits. The normal cost measures the percent of the annual payroll necessary to fund the retirement benefits that employees earn in each year. See Congressional Budget Office, Adjustments in Federal White-Collar Pay: A Technical Review of Past Proposals and the Outlook for October 1983, Staff Working Paper (March 1983), pp. 11-14.

CHAPTER IV. ALTERNATIVE MANPOWER POLICIES AND POTENTIAL SAVINGS

The analysis in Chapter III shows that the Navy should be able to obtain the manpower it needs to support the planned buildup of the fleet through 1988 with, at most, modest changes in current personnel policies. But the manpower buildup will add substantially to costs at a time when the Congress is seeking ways to curb the growth in defense spending. This chapter examines ways the Navy could adjust its manpower policies to meet most fleet manning goals while also reducing the growth in personnel costs.

One such approach would limit pay raises, but partially offset these limits with higher bonuses for enlistment and reenlistment. Another option would shift the mix of deployable ships toward the reserve force. A third approach would lengthen the average sea tour, thus reducing the demand for active-duty personnel in shore rotation billets, while offsetting adverse effects on career retention with higher sea pay.

LIMIT PAY RAISES AND INCREASE BONUSES

The cost estimates presented in Chapter III assume that all federal workers--military and civilian--receive a 4 percent pay raise in January 1984, and raises comparable to average private-sector increases thereafter. However, the Congress may choose to continue the limits on annual military pay raises beyond the current budget year. The Congress could, for example, limit pay raises through 1988 to 4 percent a year. This policy was suggested by the First Concurrent Resolution on the Budget for 1984, which assumed 4 percent raises in January of each year (1984-1986) covered by the resolution.

Limits on pay would adversely affect recruiting and retention. To partially offset these effects, the Congress might increase enlistment and reenlistment bonuses for enlisted personnel. 1/ Such a policy would hold

1. Enlistment bonuses are paid to qualified recruits who agree to serve in designated occupations. These bonuses are generally limited to $2,500 or less. Selective reenlistment bonuses (SRB) have been used by the services since 1965. The bonus is paid in selected occupations that

down personnel costs and would also target incentives toward those recruits and career personnel in greatest demand during the buildup. (Bonuses are paid only to personnel in occupations with manpower shortages.) In addition, future retirement costs would be reduced below the level of obligations incurred under a policy of full-comparability raises. 2/

Effects on Costs

Placing limits on pay raises would reduce costs substantially. Extending the 4 percent pay raise limit through 1988 would yield the Navy savings totaling $1.8 billion over the five-year period (see Table 11). These savings would be substantially larger if the pay raise limits were applied to the other services, as would be likely.

A 4 percent pay raise limit continued through 1988 would, however, cause a substantial decline in enlistments and reenlistments. CBO estimates that reenlistment rates for enlisted personnel with 5 to 12 years of service--those most likely to be affected by pay raise limits--would decline by 10 percent by 1988 if pay raises were limited to 4 percent over the next five years. To offset this decline for the occupations currently receiving

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experience shortfalls in manning. The size of the bonus may be as high as $20,000 and is calculated by multiplying the number of years in the reenlistment period by monthly basic pay. This total is then multiplied by a "skill multiple" from 1 to 6, which is set by the Navy according to the severity of the manning shortfall. In fiscal year 1983, 50 percent of all Navy reenlistments were eligible for the bonus; the average payment is estimated to be $11,100. Officers who serve in designated occupations also receive special pay and/or bonuses. For example, medical corps officers are eligible to receive additional pay for each year of continued service past their initial period of obligated service, while nuclear-trained officers receive a $3,000 bonus upon completion of training and annual bonuses for continued service.

2. "Comparability" raises refer to the size of the annual pay raises given to private-sector workers who perform similar jobs. Although these raises will generally be different for enlisted and officer personnel, and for blue-collar and white-collar civilians in the Navy, one commonly used measure of comparability is the increase in compensation received by non-farm production workers. CBO's cost estimates are based on projections of these increases consistent with the economic forecast of January 1983.

TABLE 11. EFFECTS OF ALTERNATIVE PAY RAISE POLICIES ON COSTS OF NAVY MILITARY PERSONNEL, FISCAL YEARS 1984-1988
(In millions of current dollars)

Pay Raise Policy	1984	1985	1986	1987	1988	Total 1984-1988
4 Percent Raise in 1984 and Comparability Raises Thereafter a/	360	1,200	1,960	2,775	3,625	9,920
Savings (Costs) Under Pay Raise Limits and Increased Bonuses						
4 percent raises, 1984-1988	0	180	270	575	795	1,820
Additional bonuses b/	0	(+55)	(+85)	(.120)	(+155)	(+415)
Total Savings	0	125	185	455	640	1,405

a. Pay raises for military personnel are assumed to be: January 1984, 4 percent; 1985, 5.4 percent; 1986, 5.3 percent; 1987 and 1988, 5.2 percent.

b. Bonus costs represent total new obligations rather than current year budget authority. Reenlistment bonuses are paid in installments over the term of reenlistment. Thus, current year budget authority will include past obligations.

bonuses, the average selected reenlistment bonus (SRB) payment in 1983 dollars would need to rise from $11,100 (the average budgeted for 1983) to $15,000 in 1988. 3/

This increase would, of course, add to costs. CBO estimates that the Navy will need to reenlist between 40,000 and 55,000 enlisted personnel each year through 1988 to support the buildup. Assuming that 50 percent of these reenlistments occur in occupations eligible for the bonus (roughly the percentage eligible in 1983), the Navy's budget for SRB would increase by $145 million in 1988 and by $375 million over the five-year period 1984 to 1988 (measured in current dollars).

Higher reenlistment bonuses would help correct manpower shortages, but only in skills eligible for the bonuses. Reenlistments in skills not eligible for SRB would decline as a result of pay raise limits. So would the willingness of recruits to enter the Navy. (CBO estimates that the percent of male high school graduates without prior service would fall from 79 percent under comparability raises to 70 percent by 1988.) Consequently, overall recruiting needs would rise, necessitating higher enlistment bonuses. By 1988, this could increase annual enlistment bonus costs by $10 million. 4/ Together, the total additional bonuses--enlistment and reenlistment--would add $55 million in 1985, $155 million in 1988, and $415 million over the entire five-year period (see Table 11).

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3. This calculation assumes an average enlisted pay grade of E-6 (with eight years of service), a base reenlistment rate of 50 percent, and a pay elasticity of 1.75. The pay elasticity measures the percentage change in reenlistment rates for a given change in military pay. A number of studies have estimated pay elasticities that range between 1.0 and 3.0 for different age groups. The estimates used here represent a weighted average of the first- and second-term elasticities given in David Rodney and others, The Impact of Selective Reenlistment Bonuses Upon First- and Second-Term Retention (Rehab Group, Inc., July 1980). See also the comprehensive discussion of the influence of pay on Navy reenlistments in Warner and Simon, The Empirical Analysis of Pay and Navy Enlisted Retention in the AVF (Center for Naval Analyses, December 1979).

4. This estimate assumes a pay elasticity of 1.0 for Navy high school graduate enlistments, and 4,300 payments annually (the average number for 1980 through 1982). Average enlistment bonus payments would increase from $1,750 in 1984 to $2,620 in 1988.

Despite these higher bonus costs, the combination of limits on pay raises and higher bonuses would eventually save substantial sums. Savings would amount to $640 million in 1988 and would total $1.4 billion over the five years 1984-1988 (see Table 11).

Precedent for Higher Bonuses

Increasing bonuses to solve military manpower problems is not without recent precedent. Navy enlistment bonus payments rose sharply in 1980 and 1981 as recruiting became increasingly difficult; in 1983, when the recruiting situation improved dramatically as the result of rising private-sector unemployment and higher military pay, enlistment bonuses were virtually eliminated. Thus, increasing enlistment bonuses in the future would simply return to a policy of recent years.

Selective reenlistment bonus payments in the Navy have also risen rapidly during recent years, from under 10,000 new payments in 1979 to over 26,000 in 1982, even though retention has improved during the past two years. Two factors account for this. First, the Navy has been attempting to boost career retention significantly to fill past shortages and provide for fleet expansion. Second, in 1981 the Congress approved second- and third-term reenlistment bonuses (paid to personnel who have already reenlisted once and do so again after completing eight to twelve years of service) and thus increased the proportion of the enlisted force eligible to receive the SRB. This option would thus represent the continuation of a compensation policy that already relies heavily on reenlistment bonuses.

Possible Disadvantages

Substituting bonuses for pay raises would have some disadvantages. Since not all occupations are eligible for bonuses, the total number of career personnel would be lower than if comparability pay raises were given. CBO estimates that by 1988 the career force would be smaller by 4,000 under the bonus substitution policy. Under this study's economic assumptions (with unemployment falling to 6.9 percent by 1988), the Navy would fall short of its career force goal of 258,000. However, this aggregate deficiency would be made up of some skills that are overmanned and others that are short. The Navy could use its expanded bonus resources to ensure that critical skills are fully manned with career personnel, and might be able to reallocate bonus resources to retrain those in overmanned skills into those that are short.

Higher bonuses would also exacerbate a problem frequently noted by critics of the bonus program, namely that some Navy personnel would receive substantially higher pay than others who faced the same risks in wartime. On the other hand, total bonuses in 1988 would amount to only about 4 percent of Navy military personnel costs. This level of skill differential pay may be reasonable in light of the need to hold down costs while keeping the Navy competitive with the private sector for highly skilled personnel.

ALTERNATIVE MANPOWER POLICIES

The relationship between Navy military manpower requirements and force levels is not rigid, as the discussion of requirements in Chapter II indicated. Requirements result in part from the number of ships and air squadrons the Navy operates. But they are also affected by policies regarding fleet organization and personnel utilization. This is particularly true for active-duty manpower, for whom assignment policies determine the rates at which personnel are trained, moved, and promoted through the system. Two options that the Navy has used in the past are discussed below: transferring ships to the reserve force, and reducing the number of active-duty personnel assigned to shore duty by lengthening sea tours.

Transfer Ships to the Naval Reserve Force

Substituting reserve personnel for active-duty personnel would be one way to reduce the Navy's requirements for active-duty manpower. The Navy is currently planning to introduce 25 ships into the reserve force from 1983 to 1988. Fifteen ships currently in the reserve force will be retired, leaving a net gain of ten ships over the five-year period. The majority of these additions will be frigate-class ships designed for antisubmarine warfare operations. Table 12 shows the details of the Navy's plan.

The Navy could transfer additional ships to the reserve force and thereby reduce its requirements for active-duty manpower. Several factors would influence the decision to make such transfers. First, the ships selected should have enough remaining service life to permit a useful period for training in the reserve fleet. Second, to maintain the most capable ships in the active fleet, ships transferred to the reserves should be older and hence have less operational capability than the more recent ship designs. And third, the Navy should possess sufficient total numbers of ships in each class such that transfers to the reserve force would not place undue stress upon peacetime operating schedules. Reserve ships, even with crews including 65 percent active-duty personnel, cannot be routinely deployed in peacetime.

TABLE 12. NAVAL RESERVE FORCE: NAVY PLAN, ADDITIONS TO THE NAVY PLAN, AND RESULTING ACTIVE-DUTY MANPOWER REDUCTIONS, FISCAL YEARS 1983-1988

	1983	1984	1985	1986	1987	1988
	Number of Ships					
Present Navy Plan						
Amphibious (LST, LSD)	2	2	2	2	2	2
Mine warfare (MSO, MSH, MCM)	18	18	17	18	15	16
Frigates (FF, FFG)	6	9	11	15	19	24
Destroyers (DD)	1	1	1	1	1	1
Support	6	6	1	1	0	0
Total Ships, Navy Plan	33	36	32	37	37	43
Additions to the Navy Plan						
Amphibious (LST, LSD)	0	2	3	4	5	6
Destroyers (DDG-2)	0	2	4	6	8	10
Battleships	0	1	2	2	3	4
Total Ships, Alternative Plan	33	41	41	49	53	63
	Number of Personnel					
Active-Duty Manpower Reductions Under Alternative Plan a/						
Sea	0	1,425	2,750	3,200	4,525	5,800
Shore	0	900	1,750	2,050	2,875	3,700
Total	0	2,325	4,500	5,250	7,400	9,500

a. These estimates assume active ship manning levels of 370 for each destroyer (DDG-2), 225 for each amphibious ship (LST), and 1,650 for each battleship.

Two classes of ships--other than the frigates already transferred--might meet all three of these criteria:

- o DDG-2-class destroyers. Commissioned between 1960 and 1963, 6 of the 23 destroyers in this class have undergone overhauls to improve their anti-aircraft capabilities. The remaining 17 will begin reaching their end of service in 1990. Since they are less capable than the newer Spruance class, and the Navy currently has 69 destroyers in total, some transfers to the reserve force may be possible.

- o Amphibious vessels (LST, LSD). The Navy currently has 33 ships in these two classes, of which two are assigned to the Naval Reserve Force. These ships were commissioned between 1969 and 1972 and will begin reaching their end of service in the early 1990s. The Navy also plans to build nine additional LSD-class ships between 1983 and 1988; with these additions, it may be possible to transfer some of the older ships of both classes to the reserve force.

In addition to these two ship classes, the Navy is currently planning to reactivate three battleships to join the New Jersey, which entered active service for the third time this year. Since a primary mission of battleships is shore bombardment during a conflict, they might be candidates for transfer to the reserves. If all four were placed in the reserve force, approximately half of the increase in active-duty manpower--about 3,000 billets in all--could be avoided between 1984 and 1988.

Specifically, the alternative to the Navy's plan discussed in this study would transfer an additional ten destroyers, six amphibious ships, and four battleships to the reserve force between 1984 and 1988 (see Table 12). These transfers would reduce the number of ships in the active fleet by 15, 20, and 100 percent for the three ship classes, respectively. At the end of the five-year period, the reserve force would total 63 ships, 20 more than under the Navy's current plan. Assuming that each reserve ship carried a crew of 50 percent active-duty and 50 percent reserve personnel (as directed by the Congress for reserve frigates), the total reduction in active-duty manpower would be 1,425 in 1984, growing to 5,800 in 1988. If, in addition, enlisted rotation shore billets were also eliminated, the total reduction would be 9,500 billets in 1988 (see Table 12). On the other hand, reserve billets would grow by 1,425 in 1984 and 5,800 in 1988.

Even after paying for additional reserves, transferring additional ships to the reserves would reduce personnel costs by a net of $18 million in 1984 and about $391 million over the period 1984 to 1988 (see Table 15).

Moreover, personnel savings could be larger to the extent that already-planned increases in the Navy reserve (32,000 over 1984-1988) could be used to man the additional ships.

Operating costs would also decrease, since reserve ships steam for much shorter periods than active ships. CBO estimates that under this option annual savings in operations and maintenance costs would be $72 million in 1984, rising to $350 million by 1988.

Possible Problems. Transferring more ships to the reserve force would reduce the ships available to deploy in peacetime even though overseas commitments seem unlikely to decrease. The Navy could offset this reduction in available active ships by deploying those that remain in the active fleet for longer periods. This would increase the time spent at sea and adversely affect retention of career personnel. On the other hand, the Navy could accommodate the transfer by deploying slightly fewer ships to each overseas operating area in peacetime, thus keeping up the number of commitments and avoiding extensions of sea tours. Since the transfer of 20 more ships by 1988 to the reserves would mean a reduction of only 3.5 percent in active-duty ships available for deployment, this action might be acceptable in light of the need to hold down costs.

The supply of reserve manpower is another potential constraint. Adequate numbers of reservists in the areas where additional reserve ships are homeported would be necessary. Some additional reserve manpower may already be available. One recent study found that if reserve manning had been limited to 90 percent of wartime requirements, eight major U.S. localities would have had sufficient reserve personnel in 1980 to support training missions for either one destroyer (DD-931) or one amphibious (LST) class ship. 5/ It may also be possible to meet some or all needs for more reserves from increases already planned for 1984 through 1988. Thus, it seems likely that sufficient manpower would be available to support an expansion of the reserve force such as that shown in Table 12.

Finally, transfer of more ships to the reserves would also slow mobilization during a national emergency, since ships manned with 50 percent reservists would take longer to deploy. Nonetheless, the President has authority to recall up to 100,000 reservists without requesting Congressional approval, a policy designed to speed mobilization during an emergency.

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5. See Michael Hoert, An Analysis of Candidate Ship Classes As Potential Naval Reserve Trainees, Master's Thesis (Naval Postgraduate School, March 1980), Chapter III and Table 10.

Reduce Active-Duty Personnel Assigned to Shore Duty

In 1984, the largest portion of Navy manpower--about 300,000 civilians and over 200,000 active-duty personnel--will be utilized in shore facilities. In addition, 40,000 Selected Reserve billets are at shore installations and 12,000 reserve personnel work full time in support of active forces.

Determining the best manpower mix between civilian and military personnel in shore jobs is complicated by the need for rotation billets. As discussed previously, the Navy tries to balance the time individuals spend at sea and ashore. At present one-third of the enlisted force are assigned tours that leave them at sea 50 percent of the time or less (see Table 13). Most sailors, however, spend a greater proportion of time at sea, some of them as much as 72 percent. The average "sea/shore rotation ratio" for Navy enlisted personnel is currently about 3:2--that is, three years at sea followed by two years ashore, or 60 percent of a tour.

TABLE 13. SEA/SHORE ROTATION RATIOS AND PERCENT OF TOUR ON SEA DUTY BY PERCENT OF ENLISTED FORCE, FISCAL YEAR 1983

Sea/Shore Rotation Ratio	Percent of Tour on Sea Duty	Percent of Enlisted Force
5:2	72	15.2
4:2	67	38.4
3:2	60	5.0
4:3	57	5.5
3:3	50	23.8
Variable	less than 50	12.1

SOURCE: U.S. Navy.

To reduce the requirement for active-duty shore billets, which are used primarily for rotation purposes, the Navy could increase the rotation ratios so as to keep some sailors assigned to sea duty for longer periods of

time. Since most new recruits enlist for four years and spend a fixed period on sea duty (between two and three years), the burden of longer tours at sea would fall upon those who reenlist--that is, on the career force.

CBO estimated the effect on enlisted career requirements of increasing the current 3:2 average sea/shore rotation ratio to 3.5:2 over a period of three years. Only half of the enlisted force was assumed to be affected--those currently serving 60 percent or less time at sea (that is, with sea/shore rotation ratios of 3:2, 4:3, and 3:3). Sea tours for others were judged too long to be eligible for further extension. If each sea tour was extended by three months (and conversely, each shore tour decreased by three months) for half the enlisted force the Navy would require 4,500 fewer shore billets in 1984 and 14,500 fewer billets in 1988 for rotation purposes (see Table 14).

TABLE 14. ALTERNATIVE SEA/SHORE ROTATION POLICIES
(In thousands of career enlisted personnel)

	1984	1985	1986	1987	1988
Sea Billet Requirement	141.0	146.5	150.0	151.0	152.0
Shore Billet Requirement					
Current policy 3:2	94.0	97.6	100.0	100.7	101.3
Alternative policy 3.5:2 a/	89.5	88.6	85.7	86.3	86.8
Reduction	4.5	9.0	14.3	14.4	14.5

a. The alternative policy is assumed to take three years (1984-1986) to be fully implemented.

Effects on Productivity. Increasing the sea/shore rotation ratios would shift active-duty manpower from shore to sea billets. This could improve the fleet's readiness, since enlisted personnel are generally more productive in billets where their primary training is applicable. Nor should

the shift prevent the Navy from carrying on necessary shore operations. Unfortunately, it is difficult to assess fully the impact of lower shore manning on Navy operations because the system for determining shore requirements is less complete than for ship and squadron billets. To date, less than 50 percent of the authorized Navy shore jobs have validated standards relating workloads to manpower requirements. 6/ Nevertheless, the decreases in active-duty shore manpower shown in Table 14 are relatively small--less than 3 percent of the total military and civilian shore personnel. The Navy could probably adjust its shore workload to offset this reduction, especially since some shore billets are required primarily to maintain adequate rotation.

Additional Sea Pay. While not likely to harm productivity, lengthening sea tours would have a negative effect on retention since it would reduce the time spent ashore with families. Two studies of the factors affecting Navy retention have attempted to measure the impact of sea/shore rotation. Both found an inverse relationship between the proportion of time at sea and the reenlistment patterns for personnel completing four years of service. Using these studies, CBO estimated that an increase in the average rotation ratio from 3:2 to 3.5:2 over the next three years would mean that the Navy's career force would be 1,000 smaller in 1984 and 3,000 smaller in 1988. 7/

Such a decline would be inconsistent with the Navy's desire to increase the size of its career force. Offering additional sea pay would increase

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6. The Navy is currently developing a system (SHORESTAMPS) for determining shore based work requirements covering both military and civilian personnel. At the end of 1983, 251,000 jobs will be included, representing 47 percent of all shore positions. See Manpower Requirements Report, FY 1984, Department of Defense (February 1983), page IV-3.

7. See M. Goldberg and John Warner, The Influence of Non-Pecuniary Factors on Labor Supply (Center for Naval Analysis, December 1981), pp. 20-21; and David Rodney and others, The Impact of Selective Reenlistment Bonuses upon First- and Second-Term Retention (Rehab Group Inc., July 1980). In these studies, the sea/shore elasticities--measuring the percentage change in reenlistment rates for a 1 percent change in proportion of time at sea--were estimated to range from -0.34 to -0.79 at the mean values for first-term reenlistment rates. These results imply that in Navy occupations where sea/shore rotation is 4:2 or greater, reenlistment rates will be 3 to 5 percent lower than in occupations with 3:2 or 3:3 rotation ratios.

willingness to reenlist and extend duty for longer sea tours. (The Navy's recent experience with the sea pay increases enacted in 1980 also confirms this result.) Based on the results of previous studies, CBO estimates that offsetting the declines in retention calculated above would require an average annual increase in sea pay of $250 per Navy reenlistee. 8/ Since all career enlisted personnel who serve at sea would receive the increase--not only those reenlisting--this policy would eventually cause the Navy's sea pay budget to rise by about $30 million, or 16 percent above that currently planned for 1984 (see Table 15).

These added costs would, however, be more than offset by reducing the number of enlisted personnel assigned to shore duty. Indeed, net savings from these changes would amount to $31 million in 1984 and would total $920 million over the period 1984-1988 (see Table 15).

These results have important policy implications. They suggest that the Navy could meet manning goals at less cost by raising sea pay and extending sea tours than by holding sea tour length constant and increasing the total size of the Navy. Obviously, there are limits to this approach; it can only be used where sea/shore rotation rates are not already high. But it may be a useful approach if it can be limited to those who now spend 60 percent or less of their time at sea, the option presented in this paper.

Indeed, the Navy itself has taken a similar approach in previous years. For example, in 1976, the Navy increased enlisted sea tours by an average of three months under the Fleet Readiness Improvement Program (FRIP). Over 6,000 career enlisted personnel were transferred to sea billets from shore billets. This policy was continued until late 1978 when the rotation ratios were reduced to help offset declining enlisted retention. The 1978 change emphasizes the importance of coupling any actions to increase sea/shore rotation with increases in sea pay to offset adverse effects on retention.

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8. This estimate was made using a sea/shore rotation elasticity of -0.55, a pay elasticity of 2.5 for Navy first-term reenlistments, and a base reenlistment rate of 40 percent. Under these assumptions, the average annual pay increase required to offset the effect of a 3.5:2 rotation policy is 1.4 percent. Assuming that all career personnel serving in sea billets receive this percentage increase, an average pay base of $17,775 for E-4 to E-9 personnel and estimated 1984 sea pay rates, the average annual sea pay increase required is $250 per billet.

TABLE 15. SAVINGS (COSTS) FROM REDUCING THE ACTIVE FLEET SIZE AND THE NUMBER OF ENLISTED PERSONNEL ON SHORE DUTY, FISCAL YEARS 1984-1988
(In millions of current year dollars)

	1984	1985	1986	1987	1988	Total 1984-1988
Reduce the Active Fleet and Increase the Reserve Fleet						
Active-duty and Reserve personnel costs	18.0	50.0	76.0	103.0	146.0	391.0
Increase Sea/Shore Rotation for Enlisted Personnel						
Active-duty personnel costs	41.0	130.0	237.0	307.0	325.0	1,040.0
Additional sea pay	(+10.0)	(+20.0)	(+30.0)	(+30.0)	(+30.0)	(+120.0)
Total	31.0	110.0	207.0	277.0	295.0	920.0

APPENDIX

APPENDIX A. PROJECTIONS OF NAVY ENLISTED RETENTION AND RECRUITING

Enlisted Retention

To estimate the future size of the Navy's career force, CBO uses an inventory flow model to simulate the movement of personnel with over four years of active service. This model multiplies the actual number of people in each year of service at the end of fiscal year 1982 by a "continuation rate"--which measures the percentage of enlisted personnel who began the year on active duty and will remain during the following year. (The model also determines the recruit demand for a given year by adding losses to any increase in total strength from one year to the next.) The successive application of continuation rates to the projected numbers of people in each year of service generates a multiyear projection of the career force size.

The inventory model uses a set of parameters that fix the total enlisted end strength, numbers of recruits with previous military service who will be accepted, the distribution of recruits by length of initial enlistment, and rates of attrition that indicate how many recruits will fail to complete the first year of service. Table A-1 shows the values of these parameters that were used to make the projections of Navy career force size.

Reenlistment Rates

The most important variable determining the size of future career forces is the reenlistment rate. (Reenlistment rates are a subset of continuation rates and measure the proportion of persons who are eligible to separate and who choose to remain on active duty for two or more years.) Since continuation rates measure the flows of all personnel--including those not facing a reenlistment decision--reenlistment rates are more useful for analyzing the effects of changes in pay and civilian unemployment conditions. CBO adjusted the actual 1982 Navy reenlistment rates to reflect the projected patterns of military pay and unemployment in future years. These adjustments were made using CBO's estimates of pay and unemployment elasticities (see Table A-2). The formula used to make the reenlistment rate adjustments is:

TABLE A-1. CBO'S ASSUMPTIONS ABOUT FUTURE NAVY ENLISTED FORCES: END STRENGTH, ATTRITION, AND NUMBER OF RECRUITS WITH PREVIOUS MILITARY EXPERIENCE AND LENGTH OF INITIAL ENLISTMENT

	1984	1985	1986	1987	1988
Active End Strength a/ (in thousands)	509.7	521.8	531.6	537.3	542.4
Rate of Recruit Attrition (in percent)	9.3	9.3	9.3	9.3	9.3
Number of Prior Service Recruits (in thousands)	12.8	12.8	12.8	12.8	12.8
Distribution of Initial Enlistment Lengths (in percent)					
3 years	15.0	15.0	15.0	15.0	15.0
4 years	67.0	67.0	67.0	67.0	67.0
5 years	5.0	5.0	5.0	5.0	5.0
6 years	13.0	13.0	13.0	13.0	13.0

a. These figures include full-time reserve personnel (TARS).

$$\Delta r_{it} = \epsilon x \frac{P_{it} - P_{io}}{P_{io}} x\, r_{io}$$

where Δr_{it} = estimated change in the reenlistment rate for year of service i at time t

r_{io} = reenlistment rate for year of service i in base year (1982)

P_{it} = regular military compensation (RMC) in year of service i at time t

TABLE A-2. CBO PAY AND UNEMPLOYMENT ELASTICITIES USED FOR NAVY CAREER FORCE PROJECTIONS

Year of Service	Pay Elasticity	Unemployment Elasticity
1-2 a/	--	--
3	1.6	1.0
4	3.3	0.5
5	1.9	0.2
6	1.2	0.2
7	1.4	0.2
8	1.2	0.5
9	1.2	0.4
10	1.0	0.2
11	0.5	0.1
12	0.3	0.1
13	0.4	0.1
14	0.2	0.1
15	0.2	0.1
16	0.0	0.1
17	0.0	0.1
18	0.0	0.1
19	0.8	0.2
20	1.0	0.3
21	0.9	0.0
22-30 a/	--	--

a. Elasticity not calculated. Enlisted retention in these years is assumed to be controlled by Navy policies regarding attrition and promotion, rather than pay or unemployment.

P_{io} = regular military compensation (RMC) in base year 1982

ε = pay elasticity.

Adjustments for unemployment rate changes were made using the same technique with unemployment rate variables substituted for pay variables. Table A-3 shows the 1982 base reenlistment rates and the projected rates for the economic assumptions discussed in Chapter III.

TABLE A-3. CBO REENLISTMENT RATE PROJECTIONS FOR NAVY ENLISTED PERSONNEL (In percent)

Year of Service	Actual 1982	Projections 1983	1984	1985	1986	1987	1988
3	37.3	40.7	34.6	32.3	30.6	29.0	27.8
4	38.3	38.8	36.0	34.7	33.7	33.0	32.2
5	43.4	43.3	41.9	41.4	41.0	40.5	40.3
6 a/	36.9	36.4	36.4	36.4	36.4	36.4	36.4
7	62.4	62.7	60.9	60.0	59.5	58.8	58.3
8	69.4	72.1	66.9	64.6	63.0	61.2	59.8
9	75.3	77.5	72.9	70.8	69.3	68.1	66.9
10	77.8	78.5	76.2	75.2	74.5	73.6	73.0
11	81.3	81.6	80.5	79.9	79.5	79.1	78.8
12	85.7	86.3	85.1	84.3	84.0	83.6	83.3
13	91.7	91.2	91.2	91.2	91.2	91.2	91.2
14	94.3	95.0	93.7	93.1	92.6	92.2	91.7
15	95.6	96.5	94.9	94.3	93.9	93.4	93.0
16	96.1	96.1	96.1	96.1	96.1	96.1	96.1
17	97.0	97.0	97.0	97.0	97.0	97.0	97.0
18	96.9	96.9	96.9	96.9	96.9	96.9	96.9
19 b/	77.6	78.6	76.2	75.2	74.3	73.6	73.0
20	38.5	39.3	37.4	36.8	36.1	35.7	35.1
21 c/	45.4						
22	50.0						
23	55.6						
24	60.5						
25	66.2						
26	65.3						
27	60.4						
28	83.6						
29	66.7						
30 or more	38.1						

a. Year of service 6 reenlistment rates were set to constant value of 36.4 percent in 1984 to 1988. Most losses in this year of service are six-year enlistees who have previously chosen not to extend for additional service. Thus, their decisions are generally not influenced by pay and unemployment conditions at this point.

b. Projections include retirees with early discharge credit.

c. Years 21-30 not projected since "up or out" promotion and other force management policies are in effect.

Enlisted Recruiting

To project recruiting results for the Navy, CBO first estimated the total demand for recruits and divided this total between men and women according to the Navy's plans for 1984. The demand for men was further divided into demands for non-prior-service recruits and prior-service recruits. Second, the future supply of "scarce" recruits--male high school graduates with no previous service who score in categories I to III--was estimated using 1982 recruiting results adjusted for four variables: military pay, the youth unemployment rate, numbers of Navy recruiters, and the size of the youth population. Third, the number of other high school graduates with test scores in category IV--the lowest acceptable category--was projected. Because these recruits are generally available in large numbers, their numbers are determined by demand rather than supply.

Requirements for Enlisted Men and Women

Although the Navy plans to increase the number of women in the enlisted force from 37,000 in 1982 to 45,000 in 1985, no increase in female non-prior-service accessions is planned over the next several years. CBO assumed that the following numbers of enlisted men and women will be recruited in 1984 through 1988:

Type of Personnel	1984	1985	1986	1987	1988
			(in thousands)		
Non-Prior-Service	85.3	88.0	88.2	86.9	86.8
Male	75.3	78.0	78.2	76.9	76.8
Female	10.0	10.0	10.0	10.0	10.0
Prior Service (male and female)	12.8	12.8	12.8	12.8	12.8
Total Recruits	98.1	100.8	101.0	99.7	99.6

Supply of Male High School Graduates, Categories I-III

The supply of "scarce" recruits to the Navy was projected using four variables: the relative level of pay, rate of youth unemployment, the number of recruiters, and the size of the youth population. The relationship between each variable and the supply of recruits is measured by an

elasticity. CBO used the results of previous studies to select a set of elasticities on which to base the projections (see Table A-4). 1/

TABLE A-4. ASSUMED ELASTICITIES OF RECRUIT SUPPLY FOR CHANGES IN FOUR KEY VARIABLES (By service and AFQT category)

AFQT Category	Military/ Civilian Pay	Rate of Youth Unemployment	Number of Military Recruiters	Size of Youth Population
I-IIIA	1.20	0.50	0.55	0.45
IIIB	0.90	0.30	0.45	0.55

CBO's projections of the supply of scarce male recruits used the military pay and unemployment rate assumptions discussed in Chapter III. The number of recruiters was assumed to be constant at 1982 levels and the estimated number of 17- to 25-year-old males declined from 1.84 million in 1984 to 1.70 in 1988.

Supply of Other High School Graduates

The number of other high school graduates--who score in category IV on the entrance exam--was assumed to be no greater than the recent Navy recruiting results. The projections assume this rate to be 12 percent of the total male recruits.

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1. For a further discussion of the methods used to project recruiting results see Congressional Budget Office, "CBO's Method For Projecting the Recruitment and Retention of Enlisted Military Personnel," unpublished paper (November 1982). The elasticities shown in Table A-4 have been adjusted slightly to reflect changes in recruiting experience over the past two years.